Amendments to the Claims:

Please revise the claims as follows:

1. (withdrawn) An apparatus for densifying porous structures inside a furnace using pressure gradient CVI/CVD, the apparatus comprising:

a stack of porous structures, wherein each porous structure has an aperture therethrough;

at least one ring-like spacer disposed within the stack of porous structures between neighboring porous structures, the ring-like spacer encircling the apertures of the neighboring porous structures, wherein the stack of porous structures and the at least one ring-like spacer define an enclosed cavity including each porous structure aperture; and

a fixture surrounding the stack of porous structures, the fixture comprising a channel providing fluid communication between the enclosed cavity and an outer volume defined by the interior surface of the furnace.

2. (withdrawn) The apparatus of claim 1 wherein at least one of the ring-like spacers comprises a plurality of channels, the plurality of channels providing fluid communication between the enclosed cavity and the outer volume.

3. (withdrawn) The apparatus of claim 2 wherein the at least ring-like spacer with a plurality of channels is positioned in the bottom half of the stack of porous structures.

4. (withdrawn) The apparatus of claim 1 wherein the fixture comprises

a bottom plate adapted to be secured inside the furnace; and

a top plate spaced from and facing the bottom plate.

5. (withdrawn) The apparatus of claim 4 wherein the bottom plate comprises a bottom plate channel, the bottom plate channel providing fluid communication between the enclosed cavity and the outer volume.

6. (withdrawn) The apparatus of claim 5 further comprising a pressure regulation means for controlling fluid communication through the bottom plate channel.

7. (withdrawn) The apparatus of claim 4 wherein the top plate comprises a pressure regulation means for releasing gas from the enclosed cavity.

8. (withdrawn) The apparatus of claim 4 further comprising a spacing structure disposed between the bottom plate and the top plate, the spacing structure engaging the bottom plate and the top plate, the stack of porous structures being disposed between the bottom plate and the top plate with one of the porous structures adjacent the bottom plate and another of the porous structures adjacent the top plate;

wherein the spacing structure comprises an intermediate plate, disposed between the bottom plate and the top plate, that divides the stack of porous structures, the intermediate plate being disposed between a pair of the porous structures, the intermediate plate having an aperture therethrough, and wherein each intermediate plate aperture forms a part of the enclosed cavity.

9. (withdrawn) The apparatus of claim 8 further comprising a ring-like spacer disposed on either side of the intermediate plate between the intermediate plate and the porous structures, wherein at least one of the ring-like spacers disposed on either side of each intermediate plate comprises a channel providing fluid communication between the enclosed cavity and the outer volume.

10. (withdrawn) The apparatus of claim 1 wherein a majority of the ring-like spacers includes at least one channel providing fluid communication between the enclosed cavity and the outer volume.

11. (withdrawn) An apparatus for densifying porous structures inside a furnace using pressure gradient CVI/CVD, the apparatus comprising:

a stack of porous structures, wherein each porous structure has an aperture therethrough; and

a plurality of ring-like spacers disposed within the stack of porous structures between neighboring porous structures, the ring-like spacers encircling the apertures of the neighboring porous structures, wherein the stack of porous structures and the ring-like spacers define an enclosed cavity including each porous structure aperture; and wherein at least one of the ring-like spacers further comprises at least one channel providing fluid communication between the enclosed cavity and the outer volume.

12. (withdrawn) The apparatus of claim 11 wherein at least one ring-like spacer with a channel providing fluid communication between the enclosed cavity and the outer volume is positioned in the bottom half of the stack of porous structures.

13. (withdrawn) The apparatus of claim 11 further comprising

a bottom plate adapted to be secured inside the furnace, the bottom plate comprising a bottom plate channel providing fluid communication between the enclosed cavity and the outer volume; and

a top plate spaced from and facing the bottom plate.

14. (withdrawn) The apparatus of claim 13 further comprising a pressure regulation means for controlling fluid communication through the bottom plate channel.

15. (withdrawn) The apparatus of claim 11 further comprising a spacing structure disposed between the bottom plate and the top plate, the spacing structure engaging the bottom plate and the top plate, the stack of porous structures being disposed between the bottom plate and the top plate with one of the porous structures adjacent the bottom plate and another of the porous structures adjacent the top plate;

wherein the spacing structure comprises at least one intermediate plate disposed between the bottom plate and the top plate, the at least one intermediate plate being disposed between a pair of the porous structures, the at

least one intermediate plate having an aperture therethrough, and wherein the at least one intermediate plate aperture forms a part of the enclosed cavity.

16. (withdrawn) The apparatus of claim 15 further comprising a ring-like spacer disposed on either side of the at least one intermediate plate between the intermediate plate and the porous structures, wherein at least one of the ring-like spacers disposed on either side of the at least one intermediate plate comprises a channel providing fluid communication between the enclosed cavity and the outer volume.

17. (withdrawn) The apparatus of claim 11 wherein a majority of the ring-like spacers includes at least one channel providing fluid communication between the enclosed cavity and the outer volume.

18. (withdrawn) The apparatus of claim 11 wherein a ring-like spacer with a plurality of channels is positioned at regular intervals along the stack of porous structures.

19. (withdrawn) The apparatus of claim 11 wherein at least one of the ring-like spacers comprises at least three channels positioned at regular intervals along the circumference of the ring-like spacer for providing fluid communication between the enclosed cavity and the outer volume.

20. (withdrawn) The apparatus of claim 11 wherein at least one of the ring-like spacers comprises holes positioned radially through the ring-like spacer for providing fluid communication between the enclosed cavity and the outer volume.

21. (withdrawn) An apparatus for densifying porous structures inside a furnace using pressure gradient CVI/CVD, the apparatus comprising:

a bottom plate positioned in the furnace;

a top plate spaced from and facing the bottom plate;

a stack of porous structures disposed between the bottom plate and the top plate with one of the porous structures adjacent the bottom plate and another of the porous structures adjacent the top plate, each porous structure having an aperture therethrough;

at least one ring-like spacer disposed within the stack of porous structures between neighboring porous structures, the at least one ring-like spacer encircling the apertures of the neighboring porous structures and comprising two generally parallel ring sides spaced from each other and facing the neighboring porous structures;

wherein the bottom plate, the stack of porous structures, and the at least one ring-like spacer define an enclosed cavity extending from the bottom plate, including each porous structure aperture, and terminating proximate the top plate; and wherein the at least one ring-like spacer further comprises at least one channel providing fluid communication between the enclosed cavity and the outer volume.

22. (withdrawn) The apparatus of claim 21 wherein the at least one ring-like spacer comprises a plurality of ring-like spacers, each ring-like spacer comprising a compliant graphite gasket pressed against the neighboring porous structure.

23. (withdrawn) The apparatus of claim 21 wherein the at least one ring-like spacer with at least one channel is positioned in the bottom half of the stack of porous structures.

24. (withdrawn) The apparatus of claim 21 wherein a ring-like spacer with a plurality of channels is positioned at regular intervals along the stack of porous structures.

25. (withdrawn) The apparatus of claim 21 wherein the bottom plate comprises a bottom plate channel, the bottom plate channel providing fluid communication between the enclosed cavity and the outer volume.

26. (withdrawn) The apparatus of claim 21 wherein the at least one ring-like spacer comprises a plurality of ring-like spacers, and wherein substantially all of the ring-like spacers comprise at least one channel providing fluid communication between the enclosed cavity and the outer volume.

27. (withdrawn) The apparatus of claim 21 wherein the at least one ring-like spacer comprises a plurality of ring-like spacers comprising at least one channel providing fluid communication between the enclosed cavity and the outer volume, and wherein the channels in the ring-like spacers have a cross sectional area, and wherein the sum of the cross sectional areas of the channels in the ring-like spacers in a bottom half of the stack are greater than sum of the cross sectional areas of the channels in the ring-like spacers in a top half of the stack.

28. (withdrawn) The apparatus of claim 21 wherein each porous structure defines a porous structure outside diameter and each ring-like spacer defines a spacer outside diameter and a spacer inside diameter, the spacer outside diameter being greater than or equal to the porous structure outside diameter and the spacer inside diameter being slightly less than the porous structure outside diameter.

29. (withdrawn) The apparatus of claim 28 wherein a majority of the ring-like spacers includes at least three channels providing fluid communication between the enclosed cavity and the outer volume.

30. (withdrawn) The apparatus of claim 21 wherein each porous structure defines a porous structure inside diameter and each ring-like spacer defines a spacer outside diameter and a spacer inside diameter, the spacer outside diameter being slightly greater than the porous structure inside diameter and the spacer inside diameter being less than or equal to the porous structure inside diameter.

31. (withdrawn) The apparatus of claim 30 wherein a majority of the ring-like spacers includes at least three channels providing fluid communication between the enclosed cavity and the outer volume.

32. (withdrawn) The apparatus of claim 21 wherein each porous structure is annular and defines a porous structure outside diameter and a porous structure inside diameter, and wherein the stack of porous structures comprises inside diameter ring-like spacers alternated with outside diameter ring-like spacers, each outside diameter ring-like spacer having an inside diameter slightly less than the porous structure outside diameter, and an outside diameter that is greater than or equal to the porous structure outside diameter, each inside diameter ring-like spacer having an outside diameter slightly greater than the porous structure inside diameter, and an inside diameter that is less than or equal to the porous structure inside diameter.

33. (withdrawn) The apparatus of claim 32 wherein a majority of the ring-like spacers includes at least three channels providing fluid communication between the enclosed cavity and the outer volume.

34. (currently amended) A process for densifying porous structures inside a furnace ~~using pressure gradient CVI/CVD,~~ the process comprising:

providing a furnace, the furnace defining an outer volume;

assembling a multitude of porous structures and ring-like spacers in a stack with a ring-like spacer between each adjacent pair of porous structures;

disposing the stack of porous structures between a bottom plate and a top plate in the furnace, wherein the bottom plate, the stack of porous structures, and the ring-like spacers define an enclosed cavity extending from the bottom plate, including each porous structure aperture, and terminating proximate the top plate;

providing a channel for fluid communication between the enclosed cavity and the outer volume;

allowing a gas to flow through the channel while maintaining a pressure gradient between the enclosed cavity and the outer volume; and

densifying the porous structures using pressure gradient CVI/CVD.

35. (original) The process of claim 34 wherein at least one of the ring-like spacers comprises a plurality of channels, the plurality of channels providing fluid communication between the enclosed cavity and the outer volume.

36. (original) The process of claim 34 wherein the porous structures are densified from an average density of less than 0.60 g/cm^3 to an average density of greater than 1.70 g/cm^3 in a single cycle of pressure gradient CVI/CVD.

37. (original) The process of claim 36 wherein the porosity of the porous structures after densification is less than 15%.

38. (original) The process of claim 34 further comprising the step of regulating the pressure differential between the enclosed cavity and the outer volume so that it does not exceed a predetermined value.

39. (original) The process of claim 34 further comprising the steps of

providing a bottom pressure release between the enclosed cavity and the outer volume, and

releasing gas through the bottom pressure release when a pressure differential between the enclosed cavity and the outer volume reaches a predetermined value.

40. (original) The process of claim 39 wherein the predetermined pressure differential value is between 10 and 40 torr.

41. (original) The process of claim 34 further comprising the step of placing a plurality of spacer blocks between the porous structures, wherein spacer blocks are placed near the outer diameter of a porous structure if an inner-diameter type spacer is used, and wherein spacer blocks are placed near the inner diameter of a porous structure if an outer-diameter type spacer is used.

42. (currently amended) A process for densifying porous structures inside a furnace ~~using pressure gradient CVI/CVD~~, the process comprising:

providing a furnace, the furnace defining an outer volume;

assembling a multitude of porous structures and ring-like spacers in a stack with a ring-like spacer between each adjacent pair of porous structures;

disposing the stack of porous structures between a bottom plate and a top plate in the furnace, wherein the bottom plate, the stack of porous structures, and the ring-like spacers define an enclosed cavity extending from the bottom plate, including each porous structure aperture, and terminating proximate the top plate;

introducing a reactant gas into the enclosed cavity;

introducing a portion of the reactant gas into the outer volume while maintaining a pressure gradient between the enclosed cavity and the outer volume; and

densifying the porous structures using pressure gradient CVI/CVD.

43. (original) The process of claim 42 wherein a concentration of reactant gas in the enclosed cavity is greater than a concentration of reactant gas in the outer volume.

44. (original) The process of claim 42 wherein a channel provides fluid communication between the enclosed cavity and an outer volume defined by the interior surface of the furnace.

45. (original) The process of claim 42 wherein at least some of the ring-like spacers comprise a channel providing fluid communication between the enclosed cavity and the outer volume.

46. (original) The process of claim 42 wherein the porous structures are densified from an average density of less than 0.60 g/ g/cm^3 to an average density of greater than 1.70 g/ g/cm^3 in a single pressure gradient CVI/CVD cycle.

47. (new) The process of claim 34 wherein the pressure in the enclosed cavity is at least about 11 torr.

48. (new) The process of claim 34 wherein the pressure in the enclosed cavity is at least about 16 torr.

49. (new) The process of claim 34 wherein the pressure in the enclosed cavity is between about 11 torr and about 50 torr.

50. (new) The process of claim 34 further comprising introducing a reactant gas into the enclosed cavity at a first flow rate, wherein the gas flowing through the channel has a second flow rate less than 10% of the first flow rate.

51. (new) The process of claim 34 wherein the gas comprises between 5% and 20% reactant gases.

52. (new) The process of claim 34 wherein the pressure in the enclosed cavity is at least about 11 torr.

53. (new) The process of claim 34 wherein the pressure in the enclosed cavity is at least about 16 torr.

54. (new) The process of claim 34 wherein the pressure in the enclosed cavity is between about 11 torr and about 50 torr.